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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional): M4065.0369/P369

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]

on ______________________

Signature______________________

Typed or printed name ______________________

Application Number	Filed
09/752,685	January 3, 2001

First Named Inventor: Shane J. Trapp

Art Unit	Examiner
2813	J.S.J. Chen

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- [ ] applicant/inventor.
- [ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- [x] attorney or agent of record. Registration number 28,371
- [ ] attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 ______________________

____
Signature

Thomas J. D'Amico
Typed or printed name

202-785-9700
Telephone number

June 22, 2006
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

- [ ] *Total of ________ forms are submitted.

Docket No.: M4065.0369/P369
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Shane J. Trapp

Application No.: 09/752,685

Confirmation No.: 9753

Filed: January 3, 2001

Art Unit: 2813

For: METHOD FOR FORMING A CONTACT OPENING IN A SEMICONDUCTOR DEVICE

Examiner: J. S. J. Chen

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants respectfully request a review of the legal and factual bases for the rejections in the above-identified patent application. Pursuant to the guidelines set forth in the Official Gazette Notice of July 12, 2005 for the Pre-Appeal Brief Conference Program, favorable reconsideration of the subject application is respectfully requested in view of the following remarks.

The claimed invention relates to a method of forming a contact opening in a semiconductor device which utilizes a plasma etchant mixture consisting essentially of ammonia and at least one fluorocarbon. The particular combination of ammonia and at least one fluorocarbon with specific flow rates substantially reduces or eliminates the formation of an etch stop. In addition, the claimed combination forms a protective layer that prevents erosion of the sidewall spacer when a contact opening is formed.

According to the Office Action dated March 22, 2006, Claim 36-39, 41-46 and 64-70 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,140,168 ("Tan") in view of U.S. Patent No. 5,814,563 ("Ding").

Tan discloses forming a self-aligned contact opening in an undoped dielectric layer (FIG. 1B). An opening 118 is formed using photoresist 116 (FIG. 1B). Ions are then implanted into opening 118 and between sidewall spacers 108 (FIG. 1C). The doped portion of the dielectric layer is then removed with a mixture of etching reactive etching gases that "consist of methyl trifluoride (CHF_3), carbon tetrafluoride (CF_4), and argon (Ar)." (column 3, lines 45-47).

Ding relates to a process gas that provides high etch rates and highly selective etching of only a 'dielectric layer' 120. Ding employs a three-etchant composition. The fluorohydro-carbon gas is used for "forming passivating deposits 46 on the substrate 25." (column 5, lines 49-51). The NH_3-generating gas is used for enhancing the etching rates by adsorping onto the surface of the substrate (column 5, lines 51-53).

The Office Action states that it would have been obvious for those skilled in the art to modify the process of Tan et al. by using the plasma etchant mixture taught by Ding to etch the self-aligned contact with a better etch rate and improved etch selectivity without an etch stop (Office Action, page 4-5). Applicants respectfully disagree.

1.) Tan is not properly combinable with Ding because Tan teaches away from the combination. It is improper to combine references where the references teach away from their combination. In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). Tan teaches a method of etching in which "the recipe of the etchant has a higher etching rate for the silicon oxide layer serving as a dielectric layer than for the silicon nitride layer used for the spacer and the cap layer, the etching rate of the spacer and the cap layer can be ignored and the etching process stops on the spacer and the cap layer"

(column 2, lines 27-32). Therefore, Tan teaches away from changing the recipe of the etchant and especially teaches away from replacing the etchant with an etchant taught by Ding that has an "unexpectedly high dielectric etch rate" (Ding, column 2, lines 52-53) because the slower etching rate of Tan results in the plasma etch stopping on the spacer and the cap layer.

Furthermore, Tan teaches away from forming a polymeric coating on its sidewall spacers. If the etchant taught by Ding were to be used in the process taught by Tan and if it resulted in a polymeric coating formed on sidewall spacers 108, the polymeric coating would mask the etching sensitivity of sidewall spacers 108. This would necessarily defeat the purpose of Tan's process because Tan relies on the etching sensitivity of the spacer and cap layer to perform the etching process (column 2, lines 24-27).

2.) One of ordinary skill in the art would not have been motivated to modify the teachings of Tan with those of Ding as suggested by the Office Action because Ding is not pertinent to the problem with which Tan was concerned. "To establish a *prima facie* case of obviousness...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Tan relates to a process to form a self-aligned contact window that takes advantage of the etching selectivities of the various layers to control the etching process. For instance, Tan discloses that "the etching process for the self-aligned contact window 124 can be smoothly performed due to the *etching selectivities of the dielectric layer 114a, the cap layer 106, and the spacer 108*." (column 3, lines 52-55) (emphasis added). Thus, Tan teaches using an appropriate etching rate that will not etch the sidewall spacer so that the spacer acts as a protection for the gatestack during

the etching of a pre-determined doped region. Ding, in contrast, relates to a process gas that provides unexpectedly high etch rates (column 2, lines 52-53) used to etch a dielectric 20 on a substrate 25 (column 5, lines 45-47).

One skilled in the art would not be motivated to combine the opposite methods of Tan and Ding. Tan uses layers of the semiconductor device *itself* to control the different etch rates. Tan does not use the composition to control etch rates. Ding, in contrast, uses only the composition itself to control the etch rates. These are different processes directed to achieving different goals. A faster etch rate in Tan is *not* desired since the slower etching rate of the nitride layer results in the plasma etch stopping at the sidewall spacers 108.

3.) The Office Action has failed to make a *prima facie* case for obviousness at least because Tan in view of Ding, even of properly combinable, does not teach or suggest, *inter alia*, "that the step of etching an opening in [an] insulative layer forms a *protective layer on [the] sidewall spacers that is from about 5 to about 50 Å thick*," as recited in claim 36 (emphasis added), or that contacting an insulative layer with a plasma etchant mixture "forms a *protective layer over opposed sidewall spacers . . . that is from about 5 to about 50 Å thick*," as recited in claim 64 (emphasis added). "To establish a *prima facie* case of obviousness…the prior art reference (or references when combined) must teach or suggest all the claim limitations." In re Vaeck, 947 F.2d 488.

The Office Action mailed November 16, 2005 acknowledges that Tan in view of Ding does not disclose the thickness of the protective layer and instead contends that the thickness would be considered routine optimization because the Specification does not disclose anything critical about the claimed thickness range (Office Action, page 8). Applicants disagree.

The Office Action mailed March 22, 2006 acknowledges that Tan does not teach "forming a protective layer over the opposed side wall spacers of the adjacent gate

stacks" (Office Action, page 3). Furthermore, Ding does not teach or suggest forming a protective layer "over opposed sidewall spacers," as in the claimed invention, but rather, teaches forming a passivating deposit 46 on the side of the dielectric layer 20 that is being etched. Therefore, if the etchant taught by Ding were to be used in the process taught by Tan and if it resulted in a polymeric coating formed on the sidewall spacers, there would be no motivation modify the thickness of the coating to achieve a particular thickness because neither Tan nor Ding disclose a need for a coating on the sidewall spacers. The only motivation to modify the thickness of the coating is gleaned from Applicant's disclosure. It is improper hindsight reconstruction.

Furthermore, the specification at page 11 states that "Formation of this protective layer 35 helps to prevent erosion and destruction of the side wall spacers during the etching process and thereafter, and is therefore desirable. The protective layer 35 is typically on the order of just a few Angstroms in thickness, e.g. about 5-50 Angstroms." It is therefore clear that the proper thickness is critical to the protective layer because if the protective layer were too thin, it would not "prevent erosion and destruction of the sidewall spacers" and if the protective layer were too thick, it would impede the etching process. Thus the cited references, whether considered alone or in combination, do not teach or suggest "*all* the claim limitations" as required in order to establish a *prima facie* case of obviousness.

Claims 37-39 and 41-46 depend from claim 36. Claims 65-70 depend from claim 64. Claims 37-39, 41-46, and 65-70 are allowable along with their base claims for at least the reasons provided above, and on their own merits.